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## PROGRAM EVALUATION IN AGRICULTURAL EDUCATION: PERSUASION OR PROOF?

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Accountability, cost-effectiveness, and objective evidence of performance are terms heard these days when evaluation of educational programs is discussed. Most of the time these terms are used in contrast to other dimensions of program evaluation such as anecdote, testimonial, and constituency pressure. On the one hand, "proof" appears to be the banner; and on the other "persuasion" may be a more apt description. Apparently the tilt is toward proof rather than persuasion when it comes to evaluating almost all federally supported social action programs, whether in education, health, justice, or welfare.

One observer of the federal scheme puts it this way. "... Congress has tired of listening to requests for increased appropriations based on anecdotes and testimonials, and has increasingly demanded that ... agencies produce data on the effectiveness of their programs" (Evans, 1974). In the case of increasing appropriations for vocational education, or for that matter the continuation of present levels of federal support, that point was made distinctly clear in presentations to the AVA Board of Directors in December by both the majority and minority counsel staff persons for the House Education and Labor Committee and the Senate Human Resources Committee. The message these persons brought was clear and direct—credible quantitative data on the effectiveness of vocational education is absolutely necessary, supplemented by persuasive and convincing qualitative evidence. Incidentally, many of us in agricultural education will find these persons' perceptions of vocational agriculture interesting and, for most, annoying. We are all aware of health, education, and welfare secretary Califano's October 1978 letter to the house-senate conference committee on appropriations in which he labeled vocational education as "one of the least effective programs." Mr. Califano has toned down his rhetoric somewhat in subsequent letters to AVA Executive Director Gene Bottoms and the chairman of the National Advisory Council (Phillips, 1979).

If continuing financial support from federal and state governments is desirable if not necessary for the survival and improvement of public school education in agriculture, I offer two propositions for your consideration. First, the case for vocational agriculture rests within the broader context of arguments and evidence concerning the effectiveness of vocational education. More specifically, vocational agriculture's case is a significant part of, not separate from, the case for public vocational education. The second proposition is that the extent to which the case for vocational agriculture is convincing, credible, persuasive, and objective rests primarily with us—teachers, teacher educators, and supervisors who plan, manage, and conduct vocational and technical education programs in secondary and post-secondary schools and the accompanying teacher education programs and supervisory services of universities and state departments of education. If the theme for the decades ahead is the improvement of quality in agricultural education, and I believe that it is (Warmbrod, 1978), then it is not only appropriate but necessary that we re-examine both our policies and practices for program review and evaluation.

I am not advocating ignoring or throwing out what we are now doing. In fact, I will argue that we have some things going for us, one of the most significant being a profession-generated set of **standards for quality vocational programs in agricultural/agribusiness education** (Iowa State University, 1977). Within that context, I want to share with you some comments that I put under the four headings: the reality of mandated evaluation; outcomes against which vocational agriculture is evaluated; the interdependence of process and outcomes; and the interpretation of evaluation data.

### Mandate for Evaluation

Even a brief scanning of the provisions for vocational education (Title II) of the education amendments of 1976, public law 94-482, reveals the clear mandate from congress for the

evaluation of vocational education programs. Gordon Swanson says that evaluation is identified as the most "transcendent theme" of P.L. 94-482. I have seen a document that lists some 28 separate studies and reports mandated by legislation.

Let me list briefly the major evaluations that are mandated which, in turn, have direct implications for us as we consider policy and practice for program evaluation in agricultural education.

Beginning at the national level, the Bureau of Occupational and Adult Education is required to "conduct a review analyzing the strengths and weaknesses of programs" in at least ten states each year. In addition, the National Advisory Council on Vocational Education is charged with the responsibilities of reviewing the "administration and operation of vocational education programs" and conducting "independent evaluations of programs."

At the state level, each five-year period the states are required to "evaluate the effectiveness of each program within the state" and "evaluate, by using data collected whenever possible, by statistically valid sampling techniques, each . . . program . . . which purports to impart entry level job skills according to the extent to which program completers and leavers (I) find employment in occupations related to their training, and (II) are considered by their employers to be well-trained and prepared for employment." States are required to prepare annual accountability reports that include, among other things, a summary of the required evaluations I have just listed. State advisory councils are required to prepare and submit an annual report that evaluates the effectiveness of "vocational education programs, services, and activities."

One of the responsibilities congress assigned to the National Center for Research in Vocational Education is to work with state and local education agencies "in developing methods of evaluating programs, including the follow-up studies of program completers and leavers." Other provisions of the education amendments of 1976 direct the National Institute of Education to undertake over a five-year period "a thorough evaluation and study of vocational education programs," including a review and evaluation of consumer and homemaking programs.

What does all of this mean? The reality of evaluation is evident; the need for systematic and disciplined evaluation systems is apparent; the demands for valid and reliable data that in the final analysis originate at the local level, are almost overwhelming; and it is clear that the writers of the legislation expect the evaluations to yield data and information useful in improving the quality of programs and in formulating ongoing and future policy and program decisions. Agencies at the national level, specifically the U.S. Office of Education and the National Advisory Council on Vocational Education, evaluate state programs, activities and services. State agencies, presumably state departments of

education, and state advisory councils, evaluate local programs. Our tasks include, then, the specification of the types of data and information about agricultural education that should be generated, work to insure that data and information are as reliable and valid as possible, and the effort needed to guarantee that warranted and verifiable interpretations of evaluative data and information are made.

### Outcome Criteria

A major concern that we must deal with is the outcomes against which vocational agriculture is to be evaluated. The criteria are, pure and simple, the claims—the goals and objectives—we make for vocational education and, in turn, vocational agriculture. It is important that there be some agreement on what is to be achieved through vocational agriculture, for until there is some degree of consensus on goals there is not likely to be a great deal of agreement on appropriate criteria for assessing outcomes.

National legislation makes explicit two criteria that will be used to evaluate vocational education programs, namely, placement and employers' perceptions of how well program completers and leavers are prepared for employment. The degree to which employment is an appropriate and complete outcome criterion was a major topic of discussion and debate during an August 1978 national conference on outcome measures for vocational education conducted by the National Center for Research in Vocational Education. Several speakers, citing the "tyranny of the criterion of placement" argued appropriately, I believe, and convincingly that placement, however legitimate, is not a complete measure of the effectiveness of vocational education. It is clear that transition from school to the world of work, employment, and advancement are multi-factor phenomena and that the schools, much less vocational education, have little if any control over several of the factors involved. One of the major speakers during the conference put it this way: "There are many factors other than vocational education which may determine success . . . but the ultimate question is what difference did vocational education make?" (Venn, 1978).

In 1976 a committee of distinguished vocational educators and social and behavioral scientists under the aegis of the National Research Council of the National Academy of Sciences argued that criterion measures inadequately reflect program success when outcomes are measured in terms of initial job placement, which in turn is influenced by factors such as availability of jobs, social status, personality and intellect of students, and chance. The committee proposed that additional relevant criterion variables might include job turnover rates, job satisfaction, the socio-economic mix of students, and changes in students' self-perceptions (Committee on Vocational Education Research and Development, 1976). Others have proposed

that appropriate criteria for evaluating vocational education programs include work habits, values, and attitudes.

Before we get carried away with grandiose and all encompassing claims for vocational education, we need to remind ourselves that as expectations for vocational agriculture expand, we also broaden the criteria of evaluation. Let us be forewarned—the more we take on the more vulnerable programs are for attack. (Goodlad, 1979).

I have a difficulty in understanding how we in agricultural education programs in secondary and thought, much less argue, that completion of a vocational agriculture program can be the major or sole factor that determines whether students get jobs or not, the level of the jobs attained, wage level, job satisfaction, human relations skills, self-perceptions, attitudes, and work habits. It is unreasonable, if not naive, to expect skills acquired through vocational instruction to be so pervasive to override other factors that influence occupational success. Surely, general education skills, socioeconomic and personal characteristics of students, economic and labor market conditions, employment practices, and the reluctance or willingness of persons to be mobile are among the factors that must be considered in conjunction with placement as the prime outcome criterion (Warmbrod, 1977).

For some reason we are ignoring, for all practical purposes, the most direct outcome criterion indicating the effectiveness of vocational agriculture. Why are we reluctant to document systematically and accurately the specific occupational knowledge and skills acquired by persons who enroll in and leave or complete agricultural education programs in secondary and post-secondary schools? Knowledge acquired, skills developed, and the understanding and competence to use knowledge and skill appropriately and usefully are outcomes that indicate directly program effectiveness. Granted, the development of valid and reliable achievement and performance tests is difficult and expensive. However, what more direct evidence is there to demonstrate the worth of an educational program and to provide data useful for program improvement and redesign?

As we consider outcomes appropriate for assessing the effectiveness of agricultural education, we should pay attention not only to intended or sought for benefits but also to the "side effects," that is, both favorable and unfavorable unanticipated effects or consequences. This entails a consumers' union approach to evaluation. Such an approach, usually labeled "goal-free evaluation" (Scriven, 1972), has one attractive feature in that it lessens the likelihood of tunnel vision that sometimes accompanies assessments focusing only on alleged or sought for effects. It is not uncommon for antagonists or those who disagree with the evaluative evidence presented to call attention to some unintended outcomes as counter evidence to program effectiveness. If we are

thorough and complete in evaluating agricultural education programs, we will not blind ourselves to possible damaging side-effects that accompany programs that are successful when viewed from the perspective of the anticipated outcomes.

### **Interdependency of Process and Outcomes**

If evaluations of agricultural education programs are to make maximum contributions to the improvement of quality and to policy and program development, it is imperative, in my opinion, that the interdependence of process and outcomes be recognized and made evident. The underlying rationale of outcomes as accountability criteria requires a functional relationship between process—the instructional program—and outcomes. Data describing purported outcomes, however valid, have limited use for policy and program decision-making in the absence of a complete and accurate description of the process that supposedly had something to do with producing the outcomes observed.

If we are to improve policy and practice for program evaluation in agricultural education, we must pay more attention to describing precisely rather than grossly the various agricultural education programs being evaluated. To illustrate the point I am making, I propose that there is no single definition that describes adequately for evaluation purposes what vocational agriculture actually is in any state, much less what vocational agriculture is regionally or nationally. Those who are attempting to set up the vocational education data system mandated by the education amendments of 1976—this is the much discussed feds system—recount in considerable detail the difficulty in defining a "vocational program." I maintain that a vocational program, or a vocational agriculture program, does not exist. Instead, there are many diverse instructional experiences, activities, and content that masquerade under the guise of vocational education. My suggestion is that the energies devoted to defining a "vocational program" will be more wisely invested in developing a system that facilitates an accurate description of the multitude of different processes those enrolled in vocational programs experience.

On this score, we are at least one step ahead of our colleagues in vocational education. The profession has generated a list of process factors that describe in a very complete manner the nature of instructional programs in agriculture in secondary and post-secondary schools. I refer to the **standards for quality vocational programs in agriculture/agribusiness education** (Iowa State University, 1977) developed through the project co-directed by Harold Crawford and Richard Carter at Iowa State University. In a real sense those factors, labeled standards in the report, are actually dimensions of an instruction program deemed desirable, if not essential, if agricultural education programs are to be effective.

For the moment, allow me to label the standards "factors that describe the processes of an instructional program." With that slight redefinition, if the "standards" publication does not include the process factors that are most potent in influencing program outcomes, then we only have ourselves to blame. As I understand the process, the standards were generated and validated by the profession, not delivered on tablets of stone from some bureaucratic mountain. I grant that most of the factors listed state or imply a standard; for example, "class size is limited to a maximum of 20 students." It is not necessary to agree to the standard stated—maximum of 20 students per class—to accept class size as a potent factor in influencing program outcomes, hence a factor that can be used to describe the instructional program. It is interesting that few states, with the notable exception of the folks in Illinois, had the good sense to involve teachers in a direct and systematic manner in making decisions about which of the standards—or process factors—are most appropriate for evaluating programs in the secondary schools and community colleges (Stitt, et al., 1978; Walker and Hemp, 1978).

By the way, have you seen the recent research linking class size with student achievement? In the February 1979 issue of *Phi Delta Kappan* it is reported that the study of data on nearly 900,000 students by Gene Glass at the University of Colorado indicates conclusively that as class size decreases student achievement climbs, particularly when class size goes below 20 students. Glass is quoted as concluding "A clear and strong relationship between class size and achievement has emerged. The relationship seems slightly stronger at the secondary grades than the elementary, but it does not differ appreciably across different school subjects, levels of pupil IQ, or across several other obvious demographic features of classrooms."

I want to make clear what I believe are some important points. First outcome data, however valid and complete, hold the potential for misinterpretation in the absence of descriptive information about the program and process that accompany the outcomes observed. Appraising a program broadly defined as vocational agriculture, in contrast to a more precise description of the characteristics of the actual program delivered, may result in what some experts call appraising non-events in program evaluation (Charters and Jones, 1973). In other words, instead of appraising a program that supposedly exhibits the characteristics of what is generally defined as vocational agriculture, we may be appraising a program deficient in a number of essential characteristics functionally related to the outcomes sought. If that is the case, it is unlikely that outcome data will reveal either an effective program or data helpful for program improvement.

The second point is that we can use the standards developed through the Iowa State project

as descriptions of program characteristics, then systematically investigate the relationships between various program and process factors and the alleged outcomes of vocational agriculture, particularly outcomes pertaining to knowledge and skill possessed by those who negotiate programs successfully. Then maybe we should also apply the strategy—that is, systematically relating process to outcomes, using the standards for teacher education and state administration and supervision as proxies for process factors. But then, what would we use as outcomes?

#### Interpretation of Evaluation Data

I have alluded to some issues relevant to the interpretation of evaluation data in the previous sections; however, I think it important that we pay particular attention to interpretation if we expect others to consider our evaluations credible and persuasive.

Obviously, follow-up studies will continue to be a major procedure for obtaining information on the effectiveness of agricultural education programs. The fact that federal legislation requires data concerning placement and whether completers and leavers are considered prepared for employment by those who employ them insures continued heavy reliance on follow-up studies. We need to realize that most follow-up studies provide, at best, descriptive information rather than conclusive evidence linking outcomes in a causal manner to the program. I do not propose that we abandon follow-up studies. Instead, why don't we clean up their most flagrant deficiencies and build upon them to design evaluation studies that yield more valid information. Since most follow-up data are collected by mail questionnaire, the resulting data will in most cases be questionable unless problems of measurement error, reliability of questionnaire items, and bias due to nonresponse are dealt with. For example, it is clear that conclusions based on data provided only by mail follow-up questionnaires cannot be safely generalized because of the selective nature of the respondent group with respect to academic aptitude and family characteristics such as socioeconomic status (Flanagan et al., 1964).

A recent article comparing teacher-reported follow-up data on persons completing secondary agribusiness education programs in Alabama with follow-up data collected from the same program completers by mail questionnaire revealed major differences in the placement rates reported (Drake and Patterson, 1978). In this case, teachers reported that 56 percent of the graduates were employed full-time in occupations for which they are trained; the mail survey indicated that only 25 percent were employed full-time in occupations for which they were trained. Which do you believe or use? Researchers at the National Center for Research in Vocational Education, investigating differences among states in placement rates of vocational

education graduates found that the process of collecting placement data differentiated states with high placement rates from states with low placement rates. The more systematic the data collection process the lower the placement percentage; data collected by mail survey indicated lower placement rates than teacher-collected data; and the more narrow the definition of program completer, the lower the placement percentage (McKinney et al., 1978). The director of project baseline has also questioned the credence of placement and follow-up data for vocational education graduates (Lee, 1977).

I cite these instances to make this point. If we have flimsy data, we need to know it and use it cautiously. If we do not recognize deficiencies in follow-up data, others will.

Proper interpretation of evaluation data requires an approach to program evaluation that recognizes the multi-dimensional nature of educational programs and the multiplicity of factors that influence program outcomes (Cooley, 1978). Perhaps I can illustrate with a "Dear Abby" column.

A young girl writes: Dear Abby: I have a problem that may be of concern to other girls my age. I have just begun to date and it seems that if I do not let a boy kiss me on the first date, I never see him again. But if I do let him kiss me on the first date, I never see him again either. So how is a girl supposed to know what to do? Just Wondering.

Abby replies: Dear Just: First you can conclude that whether or not you let a boy kiss you on the first date had nothing to do with whether you see him again. I suggest you go to work on finding other possible causes of you being a one-date dolly.

If we look at the major evaluation studies of the outcomes of vocational education we tend to find ourselves in somewhat the same dilemma—there is little difference in outcomes between those who complete vocational education and those who do not. We need to be aware that the outcomes of vocational education frequently measured have "other possible causes" with some of these causes having a more direct and pervasive impact on the outcomes measured than does vocational education.

A final consideration in the interpretation of evaluation data is the realization that to evaluate is to judge. One well known expert in vocational education puts it this way: "Most decisions about education are value judgments and the long term basis for vocational education improvement will relate to value judgements rendered by users of and participants in the program, as well as the public official who is accountable for financing and solving societal problems" (Venn, 1978). If valid interpretations of outcome data are to be made, a first essential is that the data be "true." We have ample opportunity for improvement on this score as far as present outcome data are concerned. Another dimension of the truthfulness—the believability—of evaluation data has to do with the extent to which factors

other than vocational agriculture may influence the outcomes observed. These constraints must not only be recognized but their probable impact on strengthening or qualifying interpretations needs to be assessed and made evident. But even with valid and reliable data that all will accept as fact, it is not uncommon for varying interpretations to result, at least in part, as a consequence of the values or point-of-view held by those who judge.

### Summary

The gist of the matter is that we will determine the extent to which program evaluation in agricultural education is held credible by congress and others who make policy and program decisions. Likewise, we will determine whether program evaluation results in program improvement. The theory and practice of program evaluation is growing rapidly. Evidence of this growth is the recently published, two volume, 1,400-page **Handbook of Evaluation Research** (Struening and Guttentag, 1975). Evaluation models abound, ranging from systems analysis to accreditation (House, 1978; Guba, 1978).

Experts in educational evaluation appear to be moving toward the position that "evaluation persuades rather than convinces, argues rather than demonstrates, is credible rather than certain, is variably accepted rather than compelling" (House, 1977). This view of evaluation is illustrated also by the following quote: "The evaluator, instead of running alongside the train making notes through the windows, can board the train and influence the engineer, the conductor, and the passengers. The evaluator need not limit his concerns to objectives stated in advance; instead, he can also function as a naturalistic observer whose inquiries grow out of his observations. The evaluator should not concentrate on outcomes; ultimately, it may prove more profitable to study just what was delivered and how people interacted during the treatment process" (Ross and Cronbach, 1976). As I see it, our task involves designing evaluation strategies in agricultural education that link process and outcomes. Proof may be the goal, but persuasive argument and credible data are probably more likely to be attained.

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